REMARKS

Claims 1-20 are presently pending in this application. Claims 1, 3-4, 6, 8, 10-15 and 17 have been amended to more particularly define the claimed invention. Claims 17-20 have been added to claim additional features of the claimed invention.

It is noted that the amendments are made only to more particularly define the invention and **not** for distinguishing the invention over the prior art, for narrowing the scope of the claims, or for any reason related to a statutory requirement for patentability. It is further noted that, notwithstanding any claim amendments made herein, Applicant's intent is to encompass equivalents of all claim elements, even if amended herein or later during prosecution.

Applicant gratefully acknowledges the Examiner's indication that claims 11-17 have been allowed over the prior art of record, and that claims 2-3, 5-7 and 8-9 would be allowable if rewritten in independent form. However, Applicant submits that all of the claims are allowable.

Claims 1, 4 and 8 stand rejected under 35 U.S.C. §102(b) as being unpatentable over Oozu et al., U.S. Pat. No. 5,801,373.

This rejection is respectfully traversed in view of the following discussion.

I. APPLICANT'S CLAIMED INVENTION

The claimed invention (as defined, for example, by independent claim 1) is directed to a charged coupled-device (CCD) image sensor including at least four charge transfer devices each transferring signal charges in a column direction, a charge-detecting capacitor receiving signal charges at different timings from one another from the charge transfer devices through

an output gate to which the charge transfer devices are connected, and a charge-detector detecting signal charges stored in the charge-detecting capacitor.

Conventionally, charges transferred through a plurality of charge transfer devices are output through a common charge-detecting capacitor, a P^+ diffusion layer is formed extending to an area just below an output gate in order to prevent charges transferred through a plurality of charge transfer devices from being mixed with one another. That is, charge transfer devices are separated from one another even at an area just below output gates. However, this is accompanied with a problem that since an area at which charges join with one another becomes narrower in width at a location closer to a charge-detecting capacitor, a path through which charges are transferred is made narrow due to a P^+ diffusion layer, and hence, a P^+ diffusion layer is close to an adjacent P^+ diffusion layer, resulting in narrow-channel effect. If narrow-channel effect is caused, a potential is lowered, and hence, mobility speed of charges is reduced. (Application at page 7, lines 2-13.)

The claimed invention (e.g., as recited in claims 1, 8, 11-13 and 15), on the other hand, includes *a charge-detecting capacitor receiving signal charges at different timings from one another from said charge transfer devices through an output gate to which said charge transfer devices are connected.* This is feature is important to prevent narrow-channel effect caused by separation among charge transfer devices just below an output gate, and further to prevent reduction of a mobility speed of charges. (Application at page 6, lines 16-19.)

II. THE ALLEGED PRIOR ART REJECTION

35 U.S.C. § 102(b) Rejection over Oozu et al., U.S. Pat. No. 5,801,373

The Office Action rejects claims 1, 4 and 8 under 35 U.S.C. §102(b) as being allegedly anticipated over Oozu et al.

Oozu et al. generally teaches the invention of a solid-state image pickup device that detects optical signals over a wide spectrum range from a visible light range to an invisible light range. Oozu et al.'s structure includes a photoelectric conversion element for converting an optical signal in the invisible light range into an electrical signal, and photoelectric conversion elements for converting an optical signal in the visible light range into an electrical signal are formed on a common semiconductor chip. (Abstract).

The Office Action alleges that Oozu et al. anticipates Applicant's invention of independent claims 1 and 8. The Office Action's rejection is based on the teaching of Oozu et al. directed toward an embodiment identified as 2-5, starting at column 16, line 11, and referring to Figs. 35-39, and more specifically Fig. 38, that teaches 4 separate dual-type CCDs, each of which transfer an infra-red, red, green or blue signal, respectively.

However, the Office Action fails to address and Oozu et al. fails teach or suggest Applicant's claims recitation of "*a charge-detecting capacitor receiving signal charges at different timings from one another from said charge transfer devices through an output gate to which said charge transfer devices are connected.*"

The Office Action alleges that Oozu et al. teaches Applicant's above recitations by referring to the following:

> *As the scanning circuit, one of or a proper combination of a CCD type shift*

(Column 16, lines 27-32.)

However, this passage from Oozu et al. merely recites a group of common elements for CCD circuitry, namely, a (CCD type) shift register using transistors, and a (CCD type) transfer gate using transistors and fails to give any direction as to how the elements relate or operate with respect to one another. There is no teaching or suggestion regarding "*a charge-detecting capacitor receiving signal charges at different timings from one another from said charge transfer devices through an output gate to which said charge transfer devices are connected.*"

In fact, Oozu et al. teaches away from Applicant's claim recitation in that each of the dual-type (upper and lower register) CCD sensors that produce red, green, blue and infra-red signals outputs their respective signals independently of the other.

> FIG. 38 shows still another arrangement. Each sensor array has two, i.e., upper and lower CCD registers which respectively store odd and even signals. Thus, visible R, G, and B signals, and an infrared IR signal are separately read out from the upper and lower registers. (Emphasis added. Column 16, lines 51-55.)

Since Applicant's claim language recites "*a charge-detecting capacitor receiving signal charges ...from said charge transfer devices,*" Oozu et al. would have to teach that the output from *at least four charge transfer devices*, e.g., IR-CCD1, IR-CCD2, R-CCD1 and R-CCD2, would be received *at the same charge-detecting capacitor.* Since Oozu et al. teaches that each dual-type CCD register outputs a red, blue, green or infra-red signal independent of the other dual-type CCD registers, it is unlikely that the output signals of more than one dual-type CCD register are received at the same charge-detecting capacitor. One of ordinary skill in the art would recognize that a charge-detecting capacitor for a CCD device is used to transfer a charge originating from a photodiode via a charge transfer device with respect to a

single type of a CCD sensor array.

Therefore, Applicant submits that Oozu et al. fails to teach or suggest each and every element of Applicant's invention of independent claims 1 and 8, and Applicant respectfully requests Examiner to reconsider and withdraw this rejection.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-20, the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: March 20, 2006

Donald J. Lecher, Esq.
Reg. No. 41,933
Sean M. McGinn, Esq.
Reg. No. 34,386

McGinn Intellectual Property Law Group, PLLC
8321 Old Courthouse Rd., Suite 200
Vienna, Virginia 2218
(703) 761-4100
Customer No. 21254